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Expam Star Oil Corporation

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Tuxpam Star Oil Corporation

Incorporated under the Laws of the State of Delaware.

Capital, 5,000,000 shares, all Common Stock. Par Value, \$1.00.

Full paid and Non-Assessable.

No Bonds, preferred stock or other indebtedness.

OFFICERS

JEAN RICROCH
Treasurer

LOUIS ROUMAGNAC
President

FRANCIS IMANDT
Secretary

HENRY KALB
Assistant Treasurer

JOSÉ RAMON de ICAZA
General Counsel in Mexico

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HENRY S. RENAUD
General Counsel

BENJAMIN HURTADO de
MENDOZA
General Superintendent in Mexico

ELISÉE ARIÉ
Special Secretary to
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EXECUTIVE OFFICES

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TRANSFER AGENT AND REGISTRAR

United States Corporation Company, 36 Nassau Street, New York, N. Y.

Properties

The holdings of La Estrella de Tuxpam (Tuxpam Star) originally covered an area of 1392 acres situated in the region of Tuxpam, which in the opinion of the eminent geologist, Juan D. Villarelle, is the richest oil zone in Mexico.

The President, Louis Roumagnac, by purchase and contracts has acquired a large additional acreage as follows:—52,870 acres situated in

Pánuco, Tampico
Ozuluama, Vera Cruz
Amatlan, Vera Cruz
Tuxpam, Vera Cruz

The new properties are therefore:

20 acres in Tuxpam, Vera Cruz, district of El Ejido, which is in the vicinity of the city of Tuxpam, five miles from the bar of Tuxpam, where are the deposits of the Pearson Oil interests.

1250 acres in Ozuluama, Vera Cruz, in which region are situated the holdings of the Standard Oil Company, Pearson Oil, Huasteca Petroleum, etc., producing from ten to fifty thousand barrels per day.

512½ acres in Pánuco, which is one of the best producing regions, having the Mexican Petroleum Company. It is in this region that the Tuxpam Star has its operating well, with a production of 1500 barrels per day, graduation of 15 degrees Baume.

215 acres in Amatlan, Vera Cruz, in which region are situated the largest oil wells in the world, such as: Cerro Azul, producing 261,000 barrels, and Potrero del Llano, with a production of 110,000 barrels, Juan Casiano, producing 75,000 barrels, and many others producing from 20,000 to 50,000 barrels, all per day, belonging to the well-known companies, Standard Oil, Mexican Petroleum, and Pearson,

Cowdray interests, all of which corporations are showing large earnings from operations.

832½ acres in Macuspana, Tabasco, in which region is produced the purest quality of oil. It is here that many cities have been built for the accommodation of the vast army of oil workers. The oil produced from this region is found near the surface and is used for lighting and gasoline.

50,000 acres in Ebano, Tamaulipas, which is the newest acquisition of the Company.

It may therefore be stated that the Tuxpam Star Corporation has valuable oil holdings in the principal producing districts of Mexico.

All information relative to the Pánuco properties may be found in the report of Camalotes, in this pamphlet, and the Tuxpam properties are covered in the report on Tuxpam.

In addition to the above, the Tuxpam Star Oil Corporation owns two complete sets of machinery, one of which is now being used to produce the 1500 barrels of the aforementioned well, and the other, which has been placed on the lots owned by the Company in the district of Amatlan, Vera Cruz, where, in the opinion of the engineers, the Company is assured of obtaining a daily production of 20,000 barrels.

To conclude, the Tuxpam Star Oil Corporation owns and controls 54,262 acres of land; two complete sets of machinery; a well producing 1500 barrels per day; all machinery necessary for the sinking of a second well (men and materials on the ground).

The following reports and maps are given to enable the investor to locate accurately the location of the various properties.

Earnings

A recent statement issued by the President showed earnings from the producing well of *about \$25,000 per month, or 6% on the entire capitalization of the Company.* The officials feel that

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with the further opening up of the properties through the immediate sinking of additional wells on the best proven properties of the Company that the earnings for the current year will compare favorably in proportion to the earnings of the neighboring operators.

District of Tampico

The Tampico oil fields extend for a distance of 300 miles along the coast, and about 60 miles inland and are known as the world's reservoir of oil. One prominent American geologist, Prof. I. C. White, State Geologist of West Virginia, recently stated that the Tampico fields contained a supply of 14 billion barrels in proved areas.

A prominent banker who was interested in the early promotion of the Mexican Petroleum Company has stated to our firm that the sinking of a well in the vicinity of Tuxpam cannot fail to produce oil.

Conclusion

We have made a comprehensive study of the properties and prospects of the Tuxpam Star Oil Corporation, and believe that with the additional finances assured to the Company to enable it to enter upon a broad campaign of development, which will doubtless give the Company many producing wells, that the stock offers an attractive opportunity for a speculative investment at its present quotation in New York and Boston.

MAP OF LANDS

hitherto owned by the "Compania de Petróleo Camalotes, S. A.," acquired and to be explored by the Tuxpam Star Oil Corporation of New York.

This map is a local plan of the River Pánuco (Tampico), where are located 8 lots of the Tuxpam Star Oil Corporation. All the black dots indicate wells in production.

GEOLOGICAL REPORT ON OIL LANDS

hitherto owned by the "Compañía de Petróleo 'CAMALOTES' S. A.," acquired and to be explored by the "Tuxpam Star Oil Co.," of New York.

Location

The lots or fractions of lots to be explored by the Tuxpam Star Oil Co. are the following:

Two fractions of Lot No. 12, which is a fraction of Tamboyоче, Topila, belonging to the Municipal Jurisdiction of Pánuco, Canton of Ozuluama, State of Vera Cruz. One of these fractions, measuring five hectares, is located within two hundred meters South from the right bank of the Pánuco River the other fraction, measuring a half hectare, is on the Estuary of Topila, one kilometer distant from the five hectares lot mentioned above.

A fraction of Lot No. 17 of the extinguished Estate of "Santa Ana," Municipality of Pánuco, Canton of Ozuluama, State of Vera Cruz. This lot is situated on the Estuary of Vado, which, farther South, joins that of Topila.

Three fractions of land: one situated on the land known under the name of "Potrero de los Papanes"; another one on the cultivation land named "La Casa," and the third one on the "Potrero de los Higos." All of these lots are located within the Municipal Jurisdiction of Pánuco, Canton of Ozuluama, State of Vera Cruz. They are distributed on the banks of the Estuary of Tamajuil or of Llave, and belong to the extinguished property of Loma Alta, which is bound on the North by the Granadilla, and to the West by the Quiebracha and Cahuayotes properties.

All of the above mentioned lots are located in oil regions, those of Tamboyоче and Santa Ana being in the Pánuco oil region, while those of the Loma Alta estate are in the North-eastern region of Tantoyuca oil zone.

Surface

The surface of the above mentioned oil lands aggregates to 103 hectares—58 ares, distributed as follows:

One fraction of Lot No. 12 of Tamboyоче.....	5	hctrs.
One fraction of Lot No. 12 of Tamboyоче.....	0	" 50 ars.
One fraction of Lot No. 17 of Santa Ana.....	10	"
One fraction of Potrero de los Papanes land.....	38	" 8 "
One fraction of La Casa land.....	3	"
One fraction of Potrero de los Higos land.....	47	"

Total 103 hctrs. 58 ars.

Means of Communication

The means of communication in the lots making the object of this report, are numerous and easy. For instance, in the fractions of the Lot of Tamboyоче, Topila, fluvial navigation is afforded by both the Pánuco River and the Topila Estuary, which are navigable all year through, the former being only 200 meters distant from the fraction of five hectares, while the latter is contiguous to the fraction of one-half hectare. In addition to these facilities, there is also the railroad from Tampico to Pánuco, which passes within a few meters of the above mentioned fractions of lots. Both ways of communication are economical for the transportation of all kinds of machinery: on the River Pánuco, by means of barges towed by gasoline launches; by the above mentioned railroad, which follows the right bank of the Pánuco River, crosses the Creek of Topila at a point called "La Puerta." Transportation by the latter means is much more economical, especially when one considers that the unloading of the machinery may be made directly from the steamer in Tampico to the *Barge*, and from the latter to the railroad.

Relative to the Lot of Santa Ana, the easiest way of transporting the machinery, would be to use the railroad from Tampico to Pánuco up the latter town, whence it would be carried

on carts to the above Lot, which is twelve kilometers distant from the Town of Pánuco.

As for the lots of "Loma Alta," the railroad from Tampico to Pánuco may be used up to the crossing of "La Puerta," whence the machinery would be carried on carts to the lots in question.

Transportation of the Oil (Petroleum)

Lots of Tamboyоче and Topila

An economical way of transportation of the oil is afforded by the River Pánuco, using gasoline launches, towed barges, and also by the railroad from Tampico to Pánuco. Moreover, there will soon be installed a Federal and public oil conduit from Tampico to Pánuco, which will pass very near the above lots.

Santa Ana Lot

From the Santa Ana Lot, a twelve kilometers oil conduit would have to be constructed up to Pánuco, where it would be connected with the public service oil conduit, or whence it could be carried on barges up to the port of Tampico.

Loma Alta Lots

From the "Loma Alta" lots, the oil would have to be transported through an oil conduit to be constructed and connected with that of the Huasteca Petroleum Co., or that of the Mexican Petroleum Company "El Aguila" S. A., both of which pass to the East of said lots, 25 kilometers distant. That conduit could also be made to reach the Tamiahua lagoon, whence in barges, through the Chijoles Canal and the Pánuco River, the oil would be carried to Tampico.

Local Conditions

Local conditions, as regards economical conditions for the exploration of oil lands, are sufficiently favorable, especially so in the lots of Tamboyоче and Santa Ana. In fact, the oil industry has been developing on a large scale, for a long time

past, in the oil region of Pánuco, as a result of which one may count there on all necessities of life and industry; repair parts as well as everything connected with the exploration of oil lands being within easy reach. The port of Tampico is situated in the vicinity of the lots making the object of this report, and there is to be found in that city all which may tend to make the exploration of oil lands economical.

Water and Fuel

The water needed for boring purposes is abundant in all of the lots covered by this report. So the fractions of the Tamboyоче Lot are located, one in the Topila Estuary and the other quite near the Pánuco River, some two hundred meters distant from the latter; the fraction of the Santa Ana Lot is located in the Vado Estuary, while the Loma Alta lands are on the banks of the La Llave Estuary or Tamajuil. It can therefore be said that there is sufficient water to make the perforations, even by using the "Rotary" system of machinery, which may be applied to advantage especially in the fractions of Tamboyоче and Topila, while the "Standard Cable" system will prove better for the Santa Ana and the Loma Alta lots, where deeper wells have to be bored in order to obtain good results.

Fuel is cheap in all of the localities mentioned above: in those of Tamboyоче and Santa Ana there are various neighbouring oil wells that can furnish the necessary fuel at a low price, while in the Loma Alta lands lumber is very abundant and may be obtained also at a low price.

Topography

From the Gulf of Mexico, there extends Eastward a large coastal plain cut through by the rivers Pánuco and Tamesi, interrupted by isolated hills which rise rapidly from said plain, showing on various points depressions which, in rainy seasons, are transformed into small lagoons. Towards the South, the

land rises in ridges extending to Ozuluama and Tantoyuca, and the coastal plain ends West at the Sierra Madre Oriental.

The River Pánuco follows from West to East, in the coastal plain, a sinuous course, and on the right bank of that river, on level land, are located the lots of Tamboyоче and Topila; farther South, also on level land, is the Santa Ana Lot.

The Ozuluama ridge descends to the North of the Pánuco River's valley, and towards the East to the Tamiahua lagoon. In that direction, at the foot of that ridge, and in almost level land, are to be found most of the Loma Alta lots, especially those of the right bank of the Llave Estuary.

Under the topographical viewpoint, all of the lots mentioned above are favorably located, and the configuration of the land does not present any difficulty for the exploration of these oil lands.

Geological Report

The surface of all of the lots covered by this report is constituted by clay, sand, and lacustrine and pluvial alluvia. This deposit of detrital rocks covers the cretaceous-oceneous formation of the subsoil which, in turn, is constituted by grey or blueish marls, generally plastic and sometimes slaty and hard. Between these marls there are in some instances limestone strata, generally thin; under these may be found argillaceous clay and limestone of the "senonian," which crop out at the stations of Mendez and Tamasopo of the Railroad from San Luis Potosí to Tampico, and lay in cavernous limestone that contain the oil deposits.

The sedimentary rocks mentioned above are cut and injected with pleistocene basalts which crop out in some of the hills of the locality, as a result of which hills rose to interrupt the monotony of that plain, among which may be cited that called La Paz en el Ebano.

There are no basaltic manifestations to be observed either in the lands covered by this report, nor in their vicinity.

Geological Structure

The sedimentary strata mentioned above are folded, the foldings being more open in the Western part of that region, while they are relatively closer towards the East. To the West of Tampico, the above mentioned strata rise, forming a big anticlinal very well known as productive in oil, called Potrero del Llano. The outcrop (head), that is, the highest and most level part of this anticlinal or convex fold, is sufficiently wide. To the West of the said anticlinal, the strata descend through Palangana to Potrero de la Isleta and Tampuche, whence it rises again in the vicinity of the city of Pánuco to form another anticlinal fold, also very noted as oil productive, and called Pánuco-Tlacolula. Between these two anticlinals there is the concave sinclinal of Potrero de la Isleta. The course taken by this folding is that of 25° Northwest with general inclination towards Northwest, that is, toward the Gulf of Mexico. Almost normally in this folding, the sedimentary strata take another course 87° Northwest. Between the two anticlinal folds of that system, I shall indicate the one that has for axis the line I have called Tanchicuín-Guasima, which passes a little northward of the fractions of the Tamboyoché lot, covered by this report.

The fractions of Lot No. 2 of Tamboyoché, are located at the outcrop (head) of the anticlinal called Topila Potrero del Llano, and to the Southwest of the crossing of this sinclinal with the one that has its axis formed by the line called Tanchicuín-Guasima.

The fraction of Lot No. 17 of Santa Ana is in the sinclinal of Potrero de la Isleta.

The fractions of land of the Loma Alta property, are in the Eastern slope of the anticlinal of Potrero del Llano-Topila, near the sinclinal of the Tanchicuín Estuary and of Paso de Ladrones, in the vicinity of the Pueblo Viejo Lagoon.

The location of these lots of land, as regards their geological

structure, is a very important matter, for it serves to indicate the relative value of these lands under the viewpoint of the oil industry, for reasons which I shall immediately expose.

Oil Deposits

The "anticlinal" theory is the one generally accepted and which has been best verified in the oil regions of the world, including those of Mexico, for explaining the accumulation of petroleum in determined places of the subsoil. According to that theory, the oil and gas accumulate preferably in the highest part of the anticlinal foldings of the sedimentary strata, while the salt water deposits itself in the lower part of the sinclinal folds. This distribution of the gas, petroleum and salt water is due to the difference in density of these elements; in the Northern regions of the State of Vera Cruz, this distribution is also due to the fact there are there numerous cavities, cuts and fissures of limestone in which these elements accumulate, in the outcrops of the anticlinals of the above mentioned strata of limestone, which represent the parts that were subjected to efforts of extension during the folding of the strata; in the sinclinals the proportions of these strata are more compact, as a result of which it is found that in the concave folds or sinclinals, the cavities are in smaller number, making it thus less likely that oil deposits of any industrial value may be found there.

On the strength of the above mentioned theory, which, I repeat, is the best verified one, the commercial value of the fractions of the lot of land covered by this report, goes diminishing in the following order:

Fraction of half hectare, Tamboyoché; fraction of five hectares in Tamboyoché; fraction of the lot of Santa Ana; and lots situated in Loma Alta. The Santa Ana and Loma Alta lots are situated on sinclinals of the sedimentary rocks (oil produc-

ing), and their commercial value is therefore small, considered under the viewpoint of the oil industry.

Depth of the Wells

The wells to be bored in the lots of Tamboyoche may attain from 900 to 1000 meters of depth, while those of Santa Ana, and especially those of Loma Alta, may attain more than 1000 meters depth, on account of their being located in sinclinal folds, the latter being on the fold extending towards the Gulf of Mexico, which is much deeper than those of the Eastern part of that region.

The rocks to be drilled for boring these wells, are those mentioned above, that is: those covering the sedimentary ones, followed by the marls, with intercalation of thin limestone strata; then come the argilleous slate and finally the limestone, which contain the oil deposits.

Conclusions

Summing up the present report, and taking into consideration the foregoing reasoning, it may be stated that there are unmistakable probabilities that large oil deposits exist in the subsoil of the lots in question, particularly so in those of Tamboyoche and Topila, in view of their being in the neighborhood of actually producing wells of fame, such as those of the "Mexican Oil Company," the "Compañia Explotadora de Petroleo Topila," the "Compañia de Petroleo la Argentina," etc, etc.

MAP OF LANDS

covered by Lots 2, 3, 14, 21, 22 and 56 of Castillo de Teayo, and Lot No. 56 of Ocotepec in Tuxpam Canton, State of Vera Cruz, all of which is to be explored by the Tuxpam Star Oil Corporation.







GEOLOGICAL REPORT RELATIVE TO OIL LANDS

Covered by Lots Nos. 2, 3, 14, 21, 22 and 56 of CASTILLO DE TEAYO, and Lot No. 46 of OCOTEPEC in Tuxpam Canton, State of Vera Cruz, all of which is to be explored by the Mexican Oil Company called "LA ESTRELLA DE TUXPAM," S. A.

Location

The lots covered by this report are the following: First group, lots No. 2 and No. 3 within the jurisdiction of Castillo de Teayo's Municipality, Canton of Tuxpam, State of Veracruz; Second group, lots Nos. 14, 21, 22 and 56 of the same Municipality of Castillo de Teayo, and lot No. 46 of Ocotepec Municipality, which is contiguous to that of Castillo and belongs to the Canton of Tuxpam, State of Veracruz.

Lots Nos. 2 and 3, which form the first group, are located in the extreme Northeast of the Municipality of Castillo, at 40° — $49''$ of latitude North and 1° — $34''$ longitude East of Mexico City.

Most of the lots forming the second group are located in the central part of the Municipality of Castillo, 20° — $43''$ and 20° — $46''$ of latitude North, and between 1° — $30''$ and 1° — $31''$ of longitude East of Mexico City. It is to say that this second group is situated to the Southeast of the first one, from which it is separated by distances varying from eight to twelve kilometers.

Lot No. 56 is Southeast of lot No. 14, and both are on a line of inclination running toward 23 Northwest (15 Northwest of the Azimuth), line which, if prolonged to the Northeast, would pass by the wells called Alamo de Tuxpam, No. 4 of Potrero del Llano, the two wells called Alazan, Tres Hermanos and Topila; and if the said line is prolonged toward South by Southeast, it would reach the wells called Furbero, located in the Canton of Papantla, State of Veracruz.

Lots Nos. 2 and 3 are on the right bank of the Cañas Brook, to the Northeast of that place, contiguous to Cañas. Lots Nos. 14, 21 and 22 are two kilometers North of the village of Castillo, and lot No. 56 is three and one-half kilometers South by Southeast distant from said village. It would mean that the lots of the first group are in the vicinity of the village of Castillo, some to the North and some to the South of that place.

Surface

The total surface of the lots, which form the object of the present report, is five hundred thirty-three hectares, twenty-five "ares," and eighty-six "centiares," divided as follows:

Lot No. 2	Castillo de Teayo	101 Hs.	84 As.	48 Cs.
Lot No. 3	"	" 118	50	60
Lot No. 14	"	" 72	14	00
Lot No. 21	"	" 31	24	20
Lot No. 22	"	" 58	23	72
Lot No. 46	Ocotepec	112	00	00
Total			533 Hs.	25 As. 86 Cs.

Means of Communication

Concerning the lots of the first group, namely those located in the vicinity of Las Cañas, fluvial means of communication are afforded by the fact that these lots are on the right bank of the Las Cañas' brook, which empties into that of Zapotal, which, in turn, empties into the Tuxpam River, to the Southwest of the town of that name.

The distance separating said lots of Las Cañas from the town of Tuxpam, in following the above mentioned course, is thirty-two kilometers. Drilling or boring machinery may be transported with facility from Tampico to Tuxpam through the National Canal, which begins on the Pánuco River at Chijil, follows the lagoons called Tamiahua and Tampanachoco, and empties into the Tuxpam River, measuring one hundred and

seventy kilometers. In using the above course, the machinery may be carried on barges conveyed by gasoline motor launches, follow the course of the Zapotal creek and even that of Las Cañas brook, at high tide, up to that last place. As a result of the above, easy means of communciation are afforded in the first group of lots, making the object of this report.

The lots of the second group, those located in the vicinity of Castillo de Teayo, have the advantage of the fluvial transportation mentioned above, up to Las Cañas, whence, in order to reach Castillo and Rancho Nuevo, it is necessary to build a cart road for the transportation of the machinery toward that hilly spot. However, this would not prove a difficult task, for the land is not very accidented, while the distance between Las Cañas and the lots of Castillo de Teayo, is only twelve kilometers.

Transportation of the Petroleum (Oil)

The best course to follow for transporting the oil erupting from the wells which are to be bored in the lots making the object of this report, up to the cisterns whence this liquid fuel will be exported, is the following one: Construct an oil conduit sixteen kilometers long, from Castillo de Teayo to Cabellal, at which place it should be connected with that running from Alamo to Tuxpam bar or else, construct an oil conduit forty-two kilometers long from Castillo de Teayo to Cobos, then from the right bank of the Tuxpam River up to the Tuxpam bar, extending it under the water up to the anchoring-ground of the cisterns, one and a half kilometers from the bar of Tuxpam.

At the beginning, the oil could be transported from Las Cañas through the brook of that name and through that of Zapotal, up to the River Tuxpam, carrying it on barges pulled by gasoline launches. The only oil conduit which would have to be constructed being one going from Castillo de Teayo up to the pier at Las Cañas.

Economical Conditions of the Locality

Once the difficulty of building a carriage road from Las Cañas to Castillo de Teayo, for the transportation of the oil to the lots of the second mentioned group, is overcome, one finds prevailing there the best economical conditions, and may count on all necessities of life and labor obtainable at low cost, as well as wood, which may be used, in the beginning, as fuel for the first drilling works. On the other hand, as a result of the nearness of the lots, which form the object of this report, to the town of Tuxpam, repair parts as well as other implements needed for the exploration of these oil lands, can be had with facility. The water, which is an element of necessity for boring wells, especially when the "Rotary" type of machinery is used, is within reach in the brook named Las Cañas which bounds lots Nos. 2 and 3, and passes near the other lots which form the object of this report.

Consequently, one may count in this region on all necessities required for an easy and economical exploration of oil lands.

Eruptive Sources, Called "Chapopoteras," and Neighboring Oil Wells

The oil region of Tuxpam is the richest one in eruptive oil manifestations, the oil being accumulated in large quantities in the subsoil of said region. The most important "chapopoteras" (eruptive sources) of this zone are those located in the vicinity of the line I have called Topila-Potrero del Llano, and above all, those of Cerro Azul, Juan Felipe, Alazan and Potrero del Llano. To the South of Pánuco River, the line of "chapopoteras" continues with those of Palma, Las Cañas and Cañada Rica, while in the vicinity of Castillo de Teayo, there are those of Xucil, Tumbadero and Rancho Nuevo, and also, in that neighborhood, that of Tihuatlan.

Of course, the "chapopoteras" (eruptive sources) do not always indicate that oil deposits are to be found at the foot of a

vertical line passing through them: they indicate at least that in all cases, oil deposits are to be found in the subsoil of the region in which they are located. As a result, these "chapopoterias" in the vicinity of Castillo de Teayo, indicate that there are oil deposits in that locality, as well as in the Tuxpam oil region which lies to the South of the Tuxpam River.

The "chapopoterias" (eruptive sources) nearest to lots Nos. 2 and 3, Castillo de Teayo, are those of Nanchal, near Las Cañas, two and a half kilometers West of said lots; those nearest to lots Nos. 14, 21, 22 and 56, are those of the Las Cañas brook, six and a half kilometers Southwest of Castillo, as also those to the South of the Ojotpec hill, five kilometers Southeast of Castillo.

The oil wells located nearest to the lots forming the object of this report, are those of Potrero del Llano, Pearson, and Pozos de Furbero.

Let us now view from both topographical and geological points of view, the location of these lots, object of this report, in the oil region of Tuxpam, which, for various reasons, I have considered for the last fourteen years as the best oil region in Mexico.

Topography

The land is little accidented; it is a ridge rising gradually from the Northeast toward the Southwest, that is, from Tuxpam toward Castillo de Teayo and Tihuatlan; this ridge separates the water that descends toward North and Northeast into the Tuxpam River, from the water descending Southeastward to the Cazones River. This ridge is the end of one of the spurs separating from the little mountain called Matlatoyuca, which is surmounted by the Mesa de Coroneles. This configuration of the land is entirely due to erosion, which abounds in the round-shaped places. The highlands or hills nearest to the lots of Castillo de Teayo, are those of Tixtepec to the West and Ojotpec to the East of Castillo.

The lots of land forming the object of this report are located on the slightly undulated and gently inclined land which descends the Rancho Nuevo, on the brow of Ojoxtepec hill toward Castillo de Teayo and Las Cañas.

The brook which passes nearest all of the above mentioned lots, is that of Las Cañas, which bounds those of the first group, passes in the vicinity of Las Cañas, and those of the second group, which are located in the neighbourhood of Castillo de Teayo. This brook, with a very gentle course, descends into that of Zapotal to enter the Tuxpam River, North of a point called Vuelta Grande.

Geology

The geology and geological structure of Tuxpam is extremely interesting, not only on account of the difficulties which its study presents, when considering that this land is so little accidented, has so few natural cuts and is covered with an exuberant vegetation, but also in view of the close relation existing between the subterranean distribution of oil deposits and the folding of the sedimentary strata that contain said deposits.

From the coastal plain of the Gulf of Mexico, the ground rises from the city of Tuxpam toward the West of Camotipan, and to the Southwest toward Castillo de Teayo and Tihuatlan. All along this ridge, sedimentary strata of the Mioceno-Plioceneous crop out, and in various places they are fossiliferous and constituted principally of yellowish calcareous sands and white limestone. Much farther to the West, there crop out Eoceneous marl strata, while all of the Tertiary leans against borders of slate, clayey slate and Neocretaceous limestone, which crop out in the mountain far to the West, and lays at a sufficient depth in the ridge and in the coastal plain of the Gulf of Mexico, between Tuxpam and Papantla.

The Tertiary is covered in various places in that coast, and quite extensively, with detrital rocks, pleistoceneous, yellow-

ish clay, sand, gravel, river alluvions which in some places are quite thick and of extended surface.

The sedimentary rocks mentioned above, the cretaceous as well as the terciary, are cut through and injected by pleitoceneous igneous rocks and basalts which constitute mountainous massiveness, such as the mountain of Oromtepec or of Tantima; they also appear, here and there, on the surface of the land under the shape of basaltic necks or plugs, such as the little hills owe their existence to old conduits, irregularly tubular, through which rose into the sedimentary strata the basaltic lava, which in cooling and becoming solid, obstructed these conduits; later on, when the eruptive agents disintegrated and transported the sedimentary rocks which surrounded these basaltic deposits, they uncovered the above mentioned basaltic plugs, in the shape of isolated necks. Hills similar to those already mentioned follow the zone in the direction 23° Northwest (15° Northwest of azimuth), which reaches Topila in the Pánuco River, and which I have called Topila Potrero del Llano.

The folding of the sedimentary strata is difficult to study in the land of this region, in view of the fact that natural cuts are not very deep and the surface of the ground is not very hilly. However, in adding the information I have made on these lands on various occasions, to that afforded by the many perforations made in distinct places in the cantons of Ozuluama, Tantoyuca, Tuxpam and Papantla, State of Veracruz, we may consistently reach the following conclusions, relative to the geological structure of these regions:

The folding of the sedimentary strata in the oil region of Tuxpam is very gentle and takes the course 23 Northwest (15 Northwest of azimuth). The principal anticlineal, the most important convex fold, is the one the axis of which is the line I have called Topila-Potrero del Llano. The outcrop (head) of of this anticlinal is sufficiently wide, and it joins, with light secondary undulations, the outcrops (heads) of two parallel and

neighbouring anticlinals, the axes of which are formed by the lines I have called Topila-Camalote, to the West of the first mentioned name, and Naranjo-Tierra Amarilla, to the East of the same line Topila-Potrero del Llano. These undulations, the course of which is 23 Northwest, form a zone sufficiently wide, which constitutes the principal convex part as well as the principal anticlinal of the folding of the sedimentary strata of that region, said principal anticlinal having for axis, as I have said before, the line called Topila-Potrero del Llano. Parallel to this principal anticlinal, there are other secondary ones, formed on the slopes of the first. These secondary anticlinal folds have their axes formed by the following lines, which I have called: Pánuco-La Aguada-La Soldead, and Pánuco-Tlacotula, both of which are West of the axis called Topila-Potrero del Llano; to the East of this axis, there are the anticlinal folds the axes of which are formed by the lines I have called: Naranjos-Tierras Amarilla-Dos Bocas-Juan Casino, and San Sebastian-Tanguijo. Farther to the East, the strata descend in short slopes to the Northeast, namely toward the Gulf of Mexico.

Almost perpendicularly to the above mentioned folding the course of which is 23 Northwest (15 Northwest of azimuth), the sedimentary strata are slightly undulated, forming very gentle folds taking the course 87 Northeast (85 Northwest of azimuth). These secondary folds have the axes of the anticlinals formed, among others, by the lines I have called: La Aguada, Dos Bocas, Tres Hermanos, Juan Casino, Naransos, San Sebastian, Tierra Amarilla, Tanguijo and Tlacotula, Potrero del Llano, Alamo, Palma, Las Cañas, Cañada, Rica and Metlatoyuca, Tiahuatlan.

As a result of the crossing of these gentle and almost perpendicular folds of the sedimentary strata, there were formed: anticlinal and extensive cupolas, where the outcrops of anticlinals crossed each other and synclinal casks, where the synclinal troughs effected the crossing. It is to say, that the anti-

clinal cupolas and the synclinal troughs of the folding of the sedimentary strata alternate, either from North to South, or from East to West. The principal anticlineal cupolas are those lined up in the zone I have called Topila-Potrero del Llano, while the synclinal casks are in the neighborhood of the Gulf of Mexico.

In the zone of land in which are lined up the principal anticlineal cupolas, that is, in the extensive outcrop (head) of the principal anticlineal called Topila-Potrero del Llano, there appear the igneous rocks, the pleistocene basalts which cut the sedimentary strata and now crop out in the ground like big basaltic edifices, or like basaltic plugs of the irregular tubular conduits through which ascended the lava, and which have been left uncovered by the eruptive agents.

In addition to these basaltic injections, there are, in this zone, the axis of which is formed by the Topila-Potrero del Llano line, the principal eruptive petroleum sources of the subsoil, as also the oil wells which, on account of their permanent and very high production, have won a world fame. This remarkable anticlineal zone extends to the South by Southeast toward Furbero, passing through Castillo de Teayo and Rancho Nuevo. It is to say, that *all of the lots which are the object of this report, are located within the above mentioned zone, and particularly so for lots Nos. 14 and 56, near Castillo de Teayo, which are exactly on the axis of this principal anticlineal, namely, on the line Topila-Potrero del Llano-Furbero.*

In the convex part of the gentle folding taking the course of 87 Northeast, the surface of the ground is marked mainly by "chapopoteras," eruptive sources of petroleum of the subsoil. Almost in the axis of one of these perpendicular anticlineals, which I have called Palma, Las Cañas Rica, are located lots Nos. 2 and 3 of Castillo de Teayo; and quite near the axis Metlatoyuca-Tihuatlan, are lots Nos. 14, 21 and 22, while to the North of that axis and to the South of same, is lot No. 56 of Castillo de Teayo.

From what precedes, it may be deducted:

That lots Nos. 2 and 3 of Castillo de Teayo are almost situated at the intersection of the axes of two secondary anticlineals, almost perpendicular one to the other, called: Naranjos, Tierras Amarillas, with course 23 Northwest (and that of Palma, Las Cañas, Cañada, Rica, with course 87 Northeast; these axes effect the crossing in Las Cañas, as a result of which lots Nos. 2 and 3 of Castillo de Teayo are located in this anticlineal cupola.

Lots Nos. 14, 21, 22 and 56 of Castillo de Teayo are almost on the intersection of the principal anticlinal axis of the region, namely that of Topila-Potrero del Llano-Furbero with course toward 23 Northwest, with the axis of the vertical anticlineal of Matlatoyuca-Tihuatlan.

It is to say that *the first as well as the second group of lots which form the object of this report are situated in anticlinal cupolas*, of which the most important is the one located in the neighbourhood of the city of Castillo de Teayo, in view of the fact that the axis of *the principal anticlinal of the region of Tuxpam*, passes near that vicinity.

Oil Deposits

After having exposed, although summarily, the facts relative to the folding of the sedimentary strata that contain the petroleum in the region of Tuxpam, it will be an easy task to determine the commercial value of the lots, considered as oil lands, which form the object of this report.

The various theories relative to the distribution of oil deposits in the subsoil are of recent date; however, the theory called "anticlinal," for the explanation of oil accumulations, has asserted itself the world over, after having been proven in all oil regions of the world, including those of Mexico.

According to the above mentioned theory of the anticlinal, the gases and petroleum accumulate in the subsoil, preferably

in the outcrops (heads) of the anticlinal folds of the sedimentary strata, and especially in the anticlinal cupolas formed by the crossing of the anticlinal folds, almost perpendicular one to the other and in the salt water which accompanies the petroleum in the petroleum deposits, accumulates preferably in the lowest part of the synclinal folds formed by the crossing of synclinal folds, almost perpendicularly one to the other.

This theory has been fully verified in Mexico, as is shown by the presence in this anticlinal zone, which has its axis formed by the line Topila-Potrero del Llano-Furbero, of oil wells which, by the permanence and extensiveness of their production, have won a world fame. Effectively, there are to be found in the vicinity of that axis, the wells called: Topila, Palacho, Tres Hermanos, Tamalia, Carro Azul, Alzan, Potrero de Llano, Alamo de Tuxpam and Furbero, in the canton of Papantla. Amongst the above cited wells, the best of them are those located in the vicinity of the anticlinal axes of the perpendicular folding, directed toward 87 Northeast.

In the oil region of Tuxpam, the same as in the other oil regions of the Gulf of Mexico, the anticlinal cupolas which are oil productive, according to the above theory, and the synclinal troughs which generally contain only water, according to the same theory, alternate either from North to South, or from East to West; they thus form a sort of chessboard, in which the white spots would indicate good oil lands, while the black spots would represent the adjacent lands of the subsoil in which has principally accumulated salt water, which accompanies the petroleum in the subterranean cavities. These white and black spots, representing anticlinal cupolas and synclinal troughs, respectively, are each one of them sufficiently extensive in the oil region of Tuxpam.

On the basis of the theory and technical reasoning already exposed, which have been fully verified in Mexico, and in taking into account the fact that *the principal anticlinal of the oil*

regions of Mexico is the one that has its axis formed by the line I have called Topila-Potrero del Llano-Furbero, the following conclusions may be drawn:

Lots Nos. 14, 21 and 56 of Castillo de Teayo are perfectly well located: in the subsoil of said lots, there are oil deposits of commercial value, for they are situated on the axis or in the vicinity of the axis of the principal petroleum anticlinal of Mexico, in the interior of an anticlinal cupola located in that axis.

Lots Nos. 2 and 3 of Castillo de Teayo are also well located, and in the subsoil of these lots there will be found good oil deposits, for they are situated on the crossing of two secondary anticlinal axes, almost perpendicular one to the other, one of which has its axis formed by the line I have called "Naranjostierra Amarilla."

It is, therefore, to be said, that: *all of the lots of land covered by this report are good, considered as oil productive, but those numbered 14, 21, 22 and 56, which are located farther into the center of the best oil anticlinal of Mexico, said anticlinal being that which has produced the greatest quantity of crude oil, the latter cropping out like an explosive from the best oil wells of Mexico. These wells, of world fame, are located in the vicinity of the axis of this principal anticlinal, the axis of which is formed by the line "Topila-Potrero Del Llano-Furbero."*

Depth of the Wells

The average depth to be attained in the wells which will be bored in the vicinity of Castillo de Teayo, is from six hundred and fifty to seven hundred meters, at which depth the oil deposits may be reached, after the slaty marl, the clayey slate, the limestone, and the intercalated calcareous sands, all of which constitutes the terciary of this locality, have been drilled.



Conclusions

As a résumé of all that has been exposed and on the basis of the technical reasoning indicated, it is to be concluded what follows:

The exploration of the oil lots numbered 2, 3, 14, 21, 22, and 56 of Castillo de Teayo, will prove to be a complete commercial success, the same as have been successful the reliable companies that explored the lands located in the principal outcrop (head) of the big anticlineal called Topila-Potrero Del Llano-Furbero, and when considered under the point of view of oil producing, it is one of the greatest commercial value on the Veracruzan coast of the Gulf of Mexico.

One is therefore justified in stating that the oil company called "La Estrella de Tuxpam," S. A., will find oil deposits of actual commercial value, in boring wells in the lots of land covered by this report.

Dated at Mexico City, January 8, 1916.

(Signed) JUAN VILLARELLO,

Geologist.

